Space Weather Forecast

Issued on Sunday, 21 July 2024 at 01:21 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate class flares likely. Chance of G1 Minor Storms Day 3 (23 Jul).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate activity through the last 24 hours with two M-flares observed. The latest flare was M1.5 at 20/1849 UTC from a region located in the northwest. There are currently up to fourteen sunspot regions on the visible disc. The largest and most complex region has now reached the the southwest quadrant. It contains three distinct large and mature spots. Its trailing region is slightly expanding northwards and a delta spot remains visible in its central portion. Next to it, on the central meridian is another moderately sized region. It is expanding longitudinally, with a proliferation of intermediate spots. It may also have some influence on the magnetic structure of the largest and most complex one, with the potential to bring additional instability to the southern centre disk, as large magnetic looping is observed between the two. The only other region of note is in the southwest quadrant but its trailing and intermediate portions are both fading, the group gradually losing spots whilst becoming smaller in size. All other regions are either small and/or simple.

No Earth-directed CMEs (Coronal Mass Ejections) have been observed in satellite imagery.

Solar Wind / Geomagnetic Activity: Slow wind conditions have largely persisted, with minor perturbations and very small discontinuities, these indicative of weak transients. The solar wind speed was at background level. Interplanetary magnetic field (IMF) was mostly Weak but became briefly Moderate between 20/0815-1000 UTC. The north-south component was largely positive. Geomagnetic activity was Quiet throughout (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) remained at background with no solar radiation storms occurring

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate with further Moderate-class flares likely and a slight chance of Strong-class flares, mainly from the large region near south centre disk, however, isolated flares are possible from other regions across the disc.

Solar Wind /Geomagnetic Activity: The two CMEs that were observed leaving the sun on the 16 July are overdue and therefore considered too slow to generate any significant impact to Earth's geomagnetic field. Another CME has the potential to arrive early on Day 3 (23 Jul). There is currently no influence from any coronal hole fast speed stream and no obvious source of enhancement in the next few days. Consequently, geomagnetic activity is expected to be mostly Quiet with a chance of Active or even G1 / Minor Storm intervals on Day 3 (23 Jul) due to CME effects.

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Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy protons) is likely to remain at background with no solar radiation storms expected. However, any notable flare will bring a slight chance of reaching the S1 Minor Solar Radiation Storm level.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	40	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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